

Patent claims:

1. A nozzle for discharging a fluid for cleaning containers, comprising:
a rotatable nozzle body including a housing having a nozzle orifice formed therein for discharging fluid from the nozzle,
5 a first fluid drive for applying a first torque on the nozzle body and thereby rotating the nozzle body, and
a braking device comprising a second fluid drive that is separate from the first fluid drive and which is arranged to retard the rotation of the nozzle body.
- 10 2. A nozzle according to claim 1, wherein the housing of the first fluid drive includes a rotor formed from the housing of the nozzle body.
3. A nozzle according to claim 1, wherein the nozzle is made of a corrosion-resistant metal.
- 15 4. A nozzle according to claim 1, wherein the housing of the nozzle body has a cylindrical shape and encloses a substantially rotationally symmetrical interior space which is traversed by the fluid, and the first fluid drive includes a torque-generating device which imparts a torque to the fluid.
- 20 5. A nozzle according to claim 1, wherein the housing of the nozzle body has a plurality of nozzle orifices formed therein which are configured so as to produce a fan-type fluid jet which is divided into a plurality of segments.
- 25 6. A nozzle according to claim 4, wherein the torque-generating device is arranged at an entrance to the interior space and includes at least one entry opening leading from a fluid inlet to the interior space.
- 30 7. A nozzle according to claim 4, wherein the torque-generating device comprises a cylindrical section which is part of a bearing element arranged to rotatably support the nozzle body, the cylindrical section having a mantle surface as well as an annular face surface facing in a flow direction, an entry opening in the form of a groove

which is open to the mantle surface and the face surface, the groove extending so as to be inclined to the axial direction, and a small gap for bearing of the housing being established between the mantle surface and the housing of the nozzle body and arranged concentrically thereto.

5

8. A nozzle according to claim 4, wherein a plurality of entry openings are provided, which are arranged equidistant from each other in the circumferential direction.

10

9. Nozzle according to claim 1, wherein the braking device includes a breaking discharge opening provided in the housing from the discharging fluid brings about a reaction force.

15

10. A nozzle according to claim 9, wherein the breaking discharge opening is bounded circumferentially by a first wall aligned substantially axially that is inclined outward in a turning direction and upon which the discharging fluid exerts a recoil force which retards the nozzle body in its rotation movement.

20

11. A nozzle according to claim 10, wherein a second wall circumferentially bounds the breaking discharge opening, the second wall arranged approximately parallel of the first wall and ahead of the first wall in the direction of rotation of the nozzle body.

25

12. A nozzle according to claim 1, further including a bearing element for supporting the nozzle body, the bearing element carrying a shaft on an end thereof that faces away from the nozzle body and further including a securing element which is fastenable to a free end of the shaft, the securing element having an axial bearing surface and a radial bearing surface for the nozzle body.

30

13. A nozzle according to claim 12, wherein a radially outwardly projecting annular shoulder is provided on the bearing element which along with the axial bearing surface of the securing element secures the nozzle head in the axial direction with little play.

14. A nozzle according to claim 13, wherein the axial bearing surface of the securing element serves as a seal and said seal being the only sealing provided for the nozzle body in the area of the axial bearing surface.

5

15. A nozzle according to claim 1, further including a slide bearing arrangement for rotatably supporting the nozzle body.

16. A nozzle according to claim 12, further including a slide bearing arrangement for rotatably supporting the nozzle body and wherein the slide bearing arrangement comprises a cylindrical mantle surface on the bearing element that is aligned radially outward and coaxially to the axis of rotation and the radial bearing surface of the securing element.

17. A nozzle according to claim 16, wherein a fluid leak is provided to lubricate the slide bearing arrangement and the radial bearing surface.

18. A nozzle for discharging a fluid for the cleaning of containers comprising,
a rotatable nozzle body including a housing having a nozzle orifice formed therein for discharging fluid from the nozzle, and
a fluid drive including a rotor driven by the action of the fluid which is formed by the housing of the nozzle body.

19. A nozzle according to claim 18, wherein the nozzle is made of a corrosion-resistant metal.

20. A nozzle according to claim 18, wherein the housing of the nozzle body has a cylindrical shape and encloses a substantially rotationally symmetrical interior space which is traversed by the fluid, and the first fluid drive includes a torque-generating device which imparts a torque to the fluid.

21. A nozzle according to claim 18, wherein the housing of the nozzle body has a plurality of nozzle orifices formed therein which are configured so as to produce a fan-type fluid jet which is divided into a plurality of segments.

5 22. A nozzle according to claim 20, wherein the torque-generating device is arranged at an entrance to the interior space and includes at least one entry opening leading from a fluid inlet to the interior space.

10 23. A nozzle according to claim 20, wherein the torque-generating device comprises a cylindrical section which is part of a bearing element arranged to rotatably support the nozzle body, the cylindrical section having a mantle surface as well as an annular face surface facing in a flow direction, an entry opening in the form of a groove which is open to the mantle surface and the face surface, the groove extending so as to be inclined to the axial direction, and a small gap for bearing of the housing being
15 established between the mantle surface and the housing of the nozzle body and arranged concentrically thereto.

24. A nozzle according to claim 20, wherein a plurality of entry openings are provided, which are arranged equidistant from each other in the circumferential
20 direction.

25. A nozzle according to claim 18, further including a braking device comprising a second fluid drive that is separate from the first fluid drive and which is arranged to retard the rotation of the nozzle body.

26. Nozzle according to claim 25, wherein the braking device includes a breaking discharge opening provided in the housing from the discharging fluid brings about a reaction force.

30 27. A nozzle according to claim 26, wherein the breaking discharge opening is bounded circumferentially by a first wall aligned substantially axially that is inclined outward in a turning direction and upon which the discharging fluid exerts a recoil force

which retards the nozzle body in its rotation movement.

28. A nozzle according to claim 27, wherein a second wall circumferentially bounds the breaking discharge opening, the second wall arranged approximately parallel
5 of the first wall and ahead of the first wall in the direction of rotation of the nozzle body.

29. A nozzle according to claim 18, further including a bearing element for supporting the nozzle body, the bearing element carrying a shaft on an end thereof that faces away from the nozzle body and further including a securing element which is
10 fastenable to a free end of the shaft, the securing element having an axial bearing surface and a radial bearing surface for the nozzle body.

30. A nozzle according to claim 29, wherein a radially outwardly projecting annular shoulder is provided on the bearing element which along with the axial bearing
15 surface of the securing element secures the nozzle head in the axial direction with little play.

31. A nozzle according to claim 30, wherein the axial bearing surface of the securing element serves as a seal and said seal being the only sealing provided for the
20 nozzle body in the area of the axial bearing surface.

32. A nozzle according to claim 18, further including a slide bearing arrangement for rotatably supporting the nozzle body.

25 33. A nozzle according to claim 27, further including a slide bearing arrangement for rotatably supporting the nozzle body and wherein the slide bearing arrangement comprises a cylindrical mantle surface on the bearing element that is aligned radially outward and coaxially to the axis of rotation and the radial bearing surface of the securing element.

30 34. A nozzle according to claim 33, wherein a fluid leak is provided to lubricate the slide bearing arrangement and the radial bearing surface.